

Amendments to the Claims:

1. (Original) A medicament dispenser comprising:
 - (i) a housing having an outlet;
 - (ii) a medicament container locatable within said housing;
 - (iii) an electronic dose counter associated with said outlet; wherein said dose counter comprises a first sensor for directly detecting a medicament release dispensable from said medicament container through said outlet; and
 - (iv) means for detecting changes in the performance of the sensor attributable to contamination or degradation and for adjusting the operation of the dispenser to compensate, at least in part, for said changes.
2. (Original) A dispenser according to claim 1 wherein said means for detecting changes in the performance of the sensor comprises electronic means, utilising the sensor, for taking a calibration reading prior to the dispensing of a dose of medicament.
3. (Original) A dispenser according to claim 2 further comprising means for comparing the calibration reading with a predetermined threshold value indicative of satisfactory operation of the sensor and for changing an operating characteristic of the sensor and/or of one or more electronic components associated therewith, in the event that the comparison indicates a change from said satisfactory operation, in a sense tending to restore satisfactory operation of the sensor.
4. (Original) A dispenser according to claim 3 wherein the sensor includes an emitter and a detector of a beam of radiation, such as infra red radiation, and the said operating characteristic comprises the magnitude of driving current pulses applied to the emitter.
5. (Original) A dispenser according to claim 4 including means for deriving said calibration reading from electrical signals derived from the detector in

response to radiation emitted by the emitter in response to said current pulses.

6. (Currently Amended) A dispenser according to claim 4 or ~~claim 5~~ including means for progressively increasing the magnitude of said current from a starting level until said calibration reading matches said threshold level.

7. (Original) A dispenser according to claim 6, wherein the means for progressively increasing the magnitude of said current effects said increase step-wise.

8. (Original) A dispenser according to claim 7 wherein the steps are substantially equal in magnitude.

9. (Currently Amended) A dispenser according to claim 2 or ~~claim 3~~ wherein said electronic means comprises part of a servo system that directly compensates for changes in performance as they occur.

10. (Currently Amended) A dispenser according to claim 2 ~~any of claims 2 to 9~~ wherein said electronic means includes a microprocessor.

11. (Original) A medicament dispenser comprising:

- (i) a housing having an outlet;
- (ii) a medicament container locatable within said housing;
- (iii) an electronic dose counter associated with said outlet; wherein said dose counter comprises a first sensor for directly detecting a medicament release dispensable from said medicament container through said outlet; and
- (iv) means for resisting deposition of contaminants at locations capable of adversely affecting the detection of said release by said sensor.

12. (Currently Amended) A dispenser according to claim 11 wherein said means for resisting deposition of contaminants comprises one or more non-adhesive coatings of materials selected from the group consisting of such as Teflon (Registered Trade Mark), other fluoropolymers and/or anti-static agents, hydrophobic materials, and/or hydrophilic materials applied to a surface at risk of contamination.

13. (Currently Amended) A dispenser according to claim 11 ~~or claim 12~~ wherein said means for resisting deposition of contaminants comprises one or more of baffles, bluff bodies and other physical barriers or guides disposed and/or configured to obstruct the passage of contaminants toward said locations and/or to positively divert said contaminants away from said locations.

14. (Currently Amended) A dispenser according to ~~claim 11 any of claims 11 to 13~~ wherein said means for resisting deposition of contaminants comprises suitably placed and configured air inlets to permit clean air to be drawn past said locations when a patient applies suction to a mouthpiece of the dispenser whereby the dispenser is used to deliver a dose of medicament through said outlet.

15. (Original) A medicament dispenser comprising:

- (i) a housing having an outlet;
- (ii) a medicament container locatable within said housing;
- (iii) an electronic dose counter associated with said outlet; wherein said dose counter comprises a first sensor for directly detecting a medicament release dispensable from said medicament container through said outlet; and
- (iv) means for removing, at least in part, contaminants deposited at locations capable of adversely affecting the detection of said release by said sensor.

16. (Original) A dispenser according to claim 15, wherein the means for removing contaminants comprises means for applying heat to at least one said location.
17. (Original) A dispenser according to claim 16, wherein microwires or a resistive layer are deposited on a surface disposed at said at least one location to form a local heater.
18. (Original) A dispenser according to claim 16, wherein a surface disposed at said at least one location is coated, or otherwise treated, to encourage absorption of a proportion of a beam of energy used in the detection of said medicament release, or of another beam of energy used in temporary substitution for the first-mentioned beam.
19. (Original) A dispenser according to claim 18 wherein, in the event that said another beam of energy is employed, the energy of said another beam is of a different form or of a different wavelength from that of the first-mentioned beam, and wherein the said surface is treated with a material that absorbs the energy of the said another beam to a useful extent, but does not significantly absorb the energy of the first-mentioned beam.
20. (Original) A dispenser according to claim 18 wherein, in the event that said another beam of energy is employed, it is automatically generated at predetermined or random intervals that are timed and/or controlled so as not to coincide with the emission of the first-mentioned beam.
21. (Original) A dispenser according to claim 18 wherein, in the event that said another beam of energy is employed, it is generated, as part of a cleansing operation, only when calibration readings indicate that contaminants have built up to an extent that requires cleansing.

22. (Currently Amended) A dispenser according to ~~claim 15 any of claims 15 to 24~~, wherein the means for removing contaminants includes means for agitating components at or adjacent said locations.

23. (Original) A dispenser according to claim 22 wherein the means for agitating includes a piezoelectric or magnetostrictive material provided at or near a surface susceptible of contamination, and means to apply electrical oscillation signals to the said material, causing it to vibrate at one or more selected frequencies

24. (Original) A dispenser according to claim 23 wherein the piezoelectric or magnetostrictive material is annular and disposed so as to directly surround at least part of the surface, thereby to allow physical vibrations to be generated in extremely close proximity to said surface.

25. (Original) A dispenser according to claim 23 wherein piezoelectric material is deposited, or mounted as a separate entity, directly on top of the surface.

26.(Currently Amended) A dispenser according to ~~claim 15 any of claims 15 to 25~~, wherein the means for removing contaminants includes means for scraping contaminants from said locations.

27. (Original) A dispenser according to claim 26 wherein mechanically movable or electrically driven scraper devices are incorporated into the dispenser to enable contaminants to be physically scraped away from surfaces at risk.

28. (Currently Amended) A dispenser according to ~~claim 15 any of claims 15 to 27~~, wherein the means for removing contaminants includes means for generating or constraining an air flow to flush the contaminants away when the dispenser is used.

29. (Original) A dispenser according to claim 28, wherein an air flow is constrained to flow over a surface at risk by way of one or more apertures formed near the outlet; said one or more apertures being appropriately sited, configured and dimensioned such that suction, applied to a mouthpiece of the dispenser by a patient, draws air in through the one or more apertures; suitable internal ducting being provided to convey the air so drawn in to the surface at risk of contamination.

30. (Currently Amended) A medicament dispenser according to claim 1 any preceding claim, wherein said sensor comprises an emitter and a detector.

31. (Original) A medicament dispenser according to claim 30, wherein the emitter emits electromagnetic radiation.

32. (Currently Amended) A medicament dispenser according to claim 30 or ~~claim 31~~, wherein the detector detects electromagnetic radiation.

33. (Currently Amended) A medicament dispenser according to claim 31 or ~~claim 32 as dependent on claim 31~~, wherein the electromagnetic radiation emitted from the emitter is infrared, visible or ultraviolet radiation.

34. (Original) A medicament dispenser according to claim 33, wherein the radiation is in the range of 0.95 μ m to 0.35 μ m.

35. (Original) A medicament dispenser according to claim 34, wherein the radiation is in the infrared range.

36. (Original) A medicament dispenser according to claim 33, wherein the radiation has a wavelength peak at about 0.88 μ m.

37. (Currently Amended) A medicament dispenser according to claim 30 any one of claims 30 to 36, wherein the emitter is selected from the group

consisting of light emitting diode, laser, incandescent lamp,
electroluminescent light sources and/or fluorescent light sources.

38. (Original) A medicament dispenser according to claim 37, wherein the emitter further comprises a filter.

39. (Original) A medicament dispenser according to claim 38, wherein the filter is an optical filter.

40. (Original) A medicament dispenser according to claim 39, wherein the optical filter is a polarising filter.

41. (Currently Amended) A medicament dispenser according to claim 30 any one of claims 30 to 40, wherein the detector is selected from the group consisting of photodiode, phototransistor, light dependent resistor, pyroelectric detector and bolometer.

42. (Original) A medicament dispenser according to claim 41, wherein the detector further comprises a filter.

43. (Original) A medicament dispenser according to claim 42, wherein the filter is an electronic filter.

44. (Original) A medicament dispenser according to claim 42, wherein the filter is an optical filter.

45. (Original) A medicament dispenser according to claim 44, wherein the optical filter is a polarising filter.

46. (Currently Amended) A medicament dispenser according to claim 30 any one of claims 30 to 45, wherein the detector is associated with an amplifier.

47. (Original) A medicament dispenser according to claim 46, wherein the amplifier is positioned close to the detector.

48. (Currently Amended) A medicament dispenser according to claim 46 or ~~claim 47~~, wherein the amplifier is integrated with the detector.

49. (Currently Amended) A medicament dispenser according to claim 30 ~~any one of claims 30 to 48~~, wherein the detector detects an increase in radiation compared to the amount of radiation emitted by the emitter.

50. (Currently Amended) A medicament dispenser according to claim 30 ~~any one of claims 30 to 48~~, wherein the detector detects a decrease in radiation compared to the amount of radiation emitted by the emitter.

51. (Currently Amended) A medicament dispenser according to claim 49 or ~~claim 50~~, wherein the increase or decrease in detected radiation is due to interference of radiation reaching the detector by the medicament release.

52. (Original) A medicament dispenser according claim 51, wherein the interference is due to absorption of radiation by the medicament release.

53. (Original) A medicament dispenser according claim 51, wherein the interference is due to scattering of radiation by the medicament release.

54. (Original) A medicament dispenser according claim 51, wherein the interference is due to reflection of radiation by the medicament release.

55. (Original) A medicament dispenser according claim 51, wherein the interference is due to refraction of radiation by the medicament release.

56. (Original) A medicament dispenser according claim 51, wherein the interference is due to diffraction of radiation by the medicament release.

57. (Currently Amended) A medicament dispenser according to claim 30 any
~~one of claims 30 to 56~~, wherein the amount of radiation reaching the detector
is maintained at a substantially constant level by using an electronic feedback
circuit to alter the level of radiation emitted by the emitter.

58. (Currently Amended) A medicament dispenser according to claim 30 any
~~one of claims 30 to 57~~, wherein the first sensor further comprises a reflector to
reflect radiation from the emitter to the detector.

59. (Currently Amended) A medicament dispenser according to claim 30 any
~~one of claims 30 to 58~~, wherein the emitter emits radiation of more than one
wavelength and the detector detects radiation of more than one wavelength.

60. (Original) A medicament dispenser according to claim 59, wherein the first
sensor quantifies the concentration of medicament with the medicament
release by measuring radiation at one or more wavelengths.

61. (Currently Amended) A medicament dispenser according to claim 30 any
~~one of claims 30 to 60~~, wherein the dispenser additionally comprises a second
sensor for detecting a medicament release.

62. (Original) A medicament dispenser according to claim 61, wherein the
second sensor comprises an emitter and a detector.

63. (Currently Amended) A medicament dispenser according to claim 61 or
~~claim 62~~, wherein the medicament release passes the second sensor
subsequent to passing the first sensor.

64. (Currently Amended) A medicament dispenser according to claim 30 any
~~one of claims 30 to 63~~, wherein the dispenser further comprises a third
sensor.

65. (Original) A medicament dispenser according to claim 64, wherein the third sensor is sensitive to parameter selected from the group consisting of electromagnetic radiation, magnetic field, electric field, light, motion, temperature, pressure, sound, oxygen concentration, carbon dioxide concentration and moisture.

66. (Currently Amended) A medicament dispenser according to claim 64 or ~~claim 65~~, wherein the third sensor responds to actuation of the dispenser.

67. (Currently Amended) A medicament dispenser according to claim 1 ~~any preceding claim~~, wherein the first sensor is integral with the outlet.

68. (Currently Amended) A medicament dispenser according to claim 61 ~~any one of claims 61 to 67~~, wherein the second sensor is integral with the outlet.

69. (Currently Amended) A dispenser according to claim 1 ~~any preceding claim~~, wherein the first sensor is reversibly attachable to the outlet.

70. (Currently Amended) A medicament dispenser according to claim 61 ~~any one of claims 61 to 69~~, wherein the second sensor is reversibly attachable to the outlet.

71. (Currently Amended) A medicament dispenser according to claim 64 ~~any one of claims 64 to 70~~, wherein the third sensor is integral with the housing.

72. (Currently Amended) A medicament dispenser according to claim 64 ~~any one of claims 64 to 70~~, wherein the third sensor is reversibly attachable to the housing.

73. (Currently Amended) A medicament dispenser according to claim 1 ~~any preceding claim~~, wherein the dose counter is reversibly attachable to the housing.

74. (Currently Amended) A medicament dispenser according to claim 1 any preceding claim, wherein the first sensor is located on the dose counter.

75. (Currently Amended) A medicament dispenser according to claim 61 any one of claims 61 to 74, wherein the second sensor is located on the dose counter.

76. (Currently Amended) A medicament dispenser according to claim 1 any preceding claim, wherein the dispenser further comprises one or more optical wave guides.

77. (Original) A medicament dispenser according to claim 76, wherein the one or more optical wave guides are located on the housing.

78. (Currently Amended) A medicament dispenser according to claim 76 or ~~claim 77~~, wherein the optical wave guide is composed of an organic polymeric or inorganic glass fibre material.

79. (Currently Amended) A medicament dispenser according to claim 76 any one of claims 76 to 78, wherein the medicament dispenser comprises a first and a second optical wave guide per sensor.

80. (Original) A medicament dispenser according to claim 79, wherein the first optical wave guide channels radiation from the emitter to the outlet.

81. (Currently Amended) A medicament dispenser according to claim 79 or ~~claim 80~~, wherein the second optical wave guide channels radiation from the outlet to the detector.

82. (Currently Amended) A medicament dispenser according to claim 30 ~~any one of claims 30 to 81~~, wherein the emitter and detector are located on the same side of the outlet.

83. (Original) A medicament dispenser according to claim 82, wherein the radiation emitted from the emitter is reflected back to the detector by a reflective surface on the opposite side of the outlet to the emitter and detector.

84. (Original) A medicament dispenser according to claim 83, wherein the reflective surface is a surface of the outlet or is an additional component attached thereto.

85. (Currently Amended) A medicament dispenser according to claim 82 ~~any one of claims 82 to 84~~, wherein the emitter and detector are integrated into a single component.

86. (Currently Amended) A medicament dispenser according to claim 1 ~~any preceding claim~~, wherein the sensor is controlled by a digital or computational semi-conductor device.

87. (Original) A medicament dispenser according to claim 86, wherein the digital or computational semi-conductor device energises the sensor and associated electronic components to detect and respond to a medicament release every 0.1 to 100ms.

88. (Currently Amended) A medicament dispenser according to ~~claim 86 or~~ claim 87, wherein the sensor and associated electronic components are energised for 1 to 100 μ s.

89. (Currently Amended) A medicament dispenser according to claim 86 any one of claims 86 to 88, wherein the digital or computational semiconductor device returns the sensor to low power mode after a medicament release has been detected or a time-out period exceeded.

90. (Currently Amended) A medicament dispenser according to claim 1 any preceding claim, wherein the medicament container is an aerosol container.

91. (Original) A medicament dispenser according to claim 90, wherein the aerosol container comprises a suspension of medicament in a propellant.

92. (Original) A medicament dispenser according to claim 91, wherein the propellant is selected from the group consisting of HFA134a, HFA227, carbon dioxide ~~or a mixture , and mixtures~~ thereof.

93. (Original) A medicament dispenser according to claim 90, wherein the aerosol container comprises a solution of medicament in a solvent.

94. (Currently Amended) A medicament dispenser according to claim 1 any one of claims 1 to 89, wherein the medicament container is a dry-powder container.

95. (Original) A medicament dispenser according to claim 94, wherein the dry-powder container comprises a medicament and optionally excipient in dry-powder form.

96. (Currently Amended) A medicament dispenser according to claim 1 any preceding claim, wherein the dispenser is actuatable manually by the patient.

97. (Currently Amended) A medicament dispenser according to claim 1 any ~~one of claims 1 to 95~~, wherein the dispenser is actuatable by the application of non-mechanical energy to a coupling element.

98. (Currently Amended) A medicament dispenser according to claim 1 any ~~one of claims 1 to 95~~, wherein the dispenser is actuatable by the application of mechanical energy to a coupling element.

99. (Currently Amended) A medicament dispenser according to claim 97 or 98, wherein the coupling element is one or more shape memory alloy wires.

100. (Currently Amended) A medicament dispenser according to claim 1 any ~~one of claims 1 to 95~~, wherein the dispenser is actuatable by the application of non-mechanical energy to a drive means.

101. (Currently Amended) A medicament dispenser according to claim 1 any ~~one of claims 1 to 95~~, wherein the dispenser is actuatable by the application of mechanical energy to a drive means.

102. (Currently Amended) A medicament dispenser according to claim 1 any ~~preceding claim~~, wherein the medicament container further comprises a medicament selected from the group consisting of albuterol, salmeterol, fluticasone propionate, beclomethasone dipropionate, and salts thereof, and solvates thereof, and any mixtures thereof.

103. (Currently Amended) A medicament dispenser according to claim 1 any ~~preceding claim~~, wherein the outlet comprises a mouthpiece for inhalation therethrough.

104. (Currently Amended) A medicament dispenser according to claim 1 any ~~preceding claim~~, wherein the dispenser additionally comprises a

communicator for communication to enable transfer of data from the dose counter to an electronic data management system.

105. (Original) A medicament dispenser according to claim 104, wherein the data management system is a local data management system.

106. (Currently Amended) A medicament dispenser according to claim 104 ~~any one of claims 104 and 105~~, wherein the dispenser further comprises a communicator for wireless communication with a gateway to a network computer system to enable transfer of data between the network computer and the electronic data management system.

107. (Canceled)